4a.1: Activity: Making Connections Student Copy

Learning Goals:

* Model and decompose whole numbers, fractions and algebraic expressions
* Engage in algebraic thinking and reasoning
* Use manipulatives as thinking tools
* Make connections between whole numbers, fractions, and algebra

Instructions: Work through the following questions as a group.

Do not rush – you do not need to finish all of the questions.

Record your thinking on chart paper.

Listen to each other and build on each other’s ideas.

Thinking Tools: Base 10 blocks, algebra tiles, cubalinks or square tiles, graph paper

1. Represent 144 using the base 10 blocks. Show several different arrangements.

Write equivalent expressions that reflect these arrangements.

1. Now suppose the big square represents 1.

What do your arrangements illustrate?

1. Now suppose the big square represents x2.

What do your arrangements represent?

4a.2: Activity: Making Connections Teacher Copy

Learning Goals:

* Model and decompose whole numbers, fractions and algebraic expressions
* Engage in algebraic thinking and reasoning
* Use manipulatives as thinking tools
* Make connections between whole numbers, fractions, and algebra

Key Ideas:

Arrangements represent expressions

Equivalent expressions

Distribute Property

Area model for multiplication – looking at dimensions (length x width = area)

Redefining the whole

Connecting fraction meanings : operator, linear measure, part to whole (area)

Instructions: Work through the following questions as a group.

Do not rush – you do not need to finish all of the questions.

Record your thinking on chart paper.

Listen to each other and build on each other’s ideas.

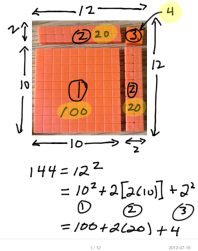
Thinking Tools: Base 10 blocks, algebra tiles, cubalinks or square tiles, graph paper

1. Represent 144 using the base 10 blocks. Show several different arrangements.

Write equivalent expressions that reflect these arrangements.

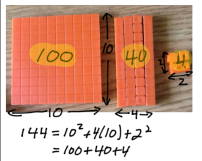
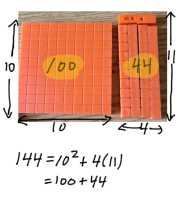
ex. 100 + (4 x 10) + 4 = (14 x 10) + 4 = 12 x 12 = (10 x 10) + 2(10 x 2) + 4

* + - * Encourage connections between “groups of” and “dimensions”

 (ex. 40 is 4 groups of 10, or 4 by 10)

* + - * Encourage many arrangements / expressions
      * Encourage the creation of a square to represent the square number. (12 x 12)
      * Encourage the four parts of the multiplication

144 = (10 x 10) + 2(10 x 2) + 4

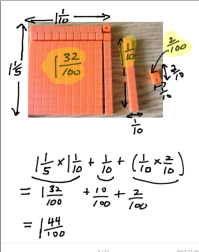


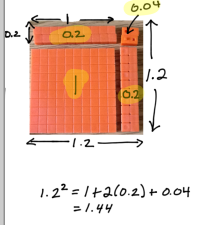
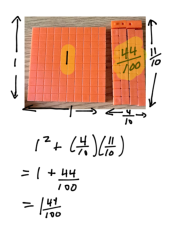
4a.2 (continued)

1. Now suppose the big square represents 1.

What do your arrangements illustrate?

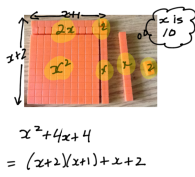
* + - * We are now redefining the whole
      * Smallest square is .01 or 1/100 of the whole
      * Row of 10 is 0.1 or 1/10 of the whole
      * Encourage use of decimal and fraction notation (10ths, 100ths)
      * Encourage the creation of a square 1 and 1/5 by 1 and 1/5 (1.2 x 1.2)
      * 1/10 of 1/10 same as 1/10 by 1/10 🡪 move to dimensions
      * Encourage the four parts of the multiplication with decimals and fractions

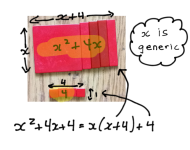
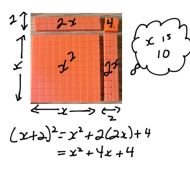


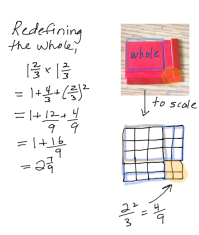
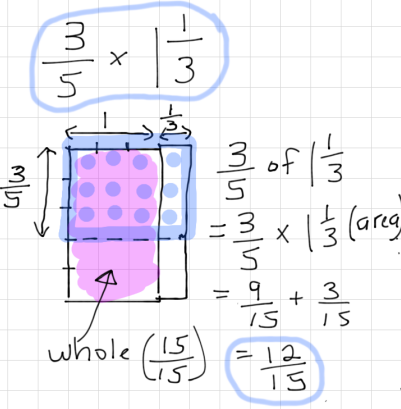
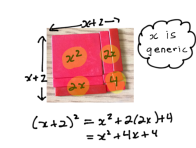
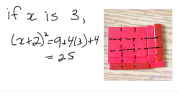


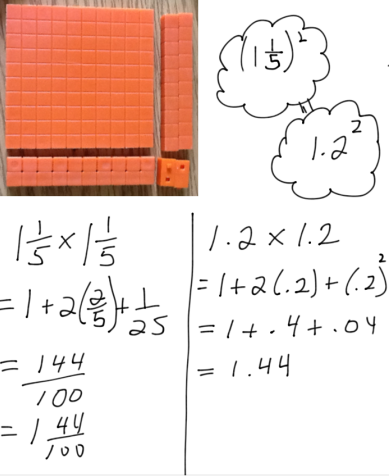
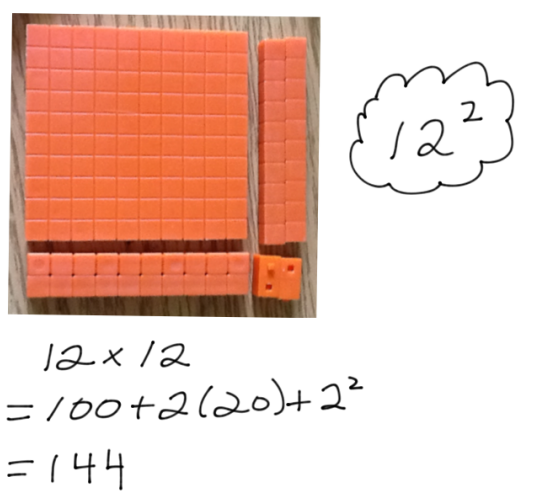
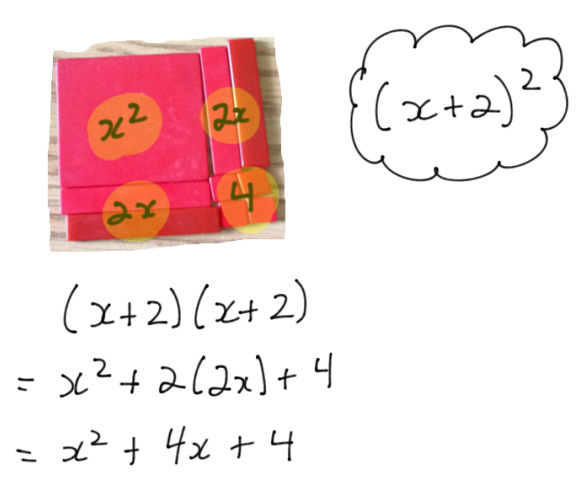
1. Now suppose the big square represents x2.

What do your arrangements represent?

* + - *  Introduce algebra tiles, and encourage connections



4a.3: Possible Anchor Chart : Algebraic Reasoning through Area Models



Distributive Property – Fractions and Decimals

Distributive Property – Whole Numbers

Distributive Property – Binomials